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GILA COUNTY COMMUNITY DEVELOPMENT

Permit #:_____

COMMERCIAL KITCHEN HOOD WORKSHEET / CHECKLIST
(Based on 2012 IBC, 2012 IFGC, 2012 IMC, 2012 IFC and 2011 NEC)

Two copies of this worksheet / checklist must accompany the two plan sets submitted with a commercial kitchen ventilation exhaust system (CKVES) permit application. This document explains and organizes information needed by Gila County Building Safety Department to efficiently review hood plans and issue permits. Gila County will keep this document as part of the permanent project file and will use it to verify code compliance. The applicant is responsible for assuring the accuracy and consistency of the information.

Project Address: _____

☐ New Building & New CKVES (hood) ☐ Existing Building w/ New CKVES ☐ Replace existing CKVES

There is a history of restaurant fires originating in commercial kitchen exhaust systems. Because of this commercial *kitchen ventilation exhaust systems*, "CKVES", are highly regulated, and have extensive code requirements. This worksheet/ checklist is an effort to clearly identify, for novices and professionals alike, what shall be documented in the CKVES plans presented for permitting.

> There are six main elements of a commercial kitchen ventilation exhaust hood "system"- the equipment that requires exhaust ventilation, the actual ventilation exhaust hood, the ventilation exhaust hood duct; the ventilation exhaust fan, the make-up air source, and the exhaust hood fire suppression system. In Gila County the adopted codes that govern CKVES are the 2012 International Mechanical Code (IMC), 2012 International Building Code (IBC), 2011 National Electrical Code (NEC). The 2012 International Fire Code (IFC) was adopted by the Arizona State Fire Marshal. For commercial kitchens there are two types of hoods that can be required. For most all cooking equipment that produces grease or smoke a Type I hood is required. For some warming equipment and for most all automatic washers a Type II hood is required.

The following plans are required:

- ☐ Kitchen floor plan (gas and electrical)
- ☐ Hood plan (elevation)
- ☐ Duct Plan (section)
- ☐ Roof Plan or site plan
- ☐ Fire Suppression Plan

The following explains the requirements for plans, information and documentation by element:

Equipment

- ☐ 1. Provide a scaled and dimensioned floor plan of the kitchen showing all cooking and warming equipment, and all automatic washers. Floor plan needs to clearly indicate what equipment is to be located under any hoods. Hood dimensions need to be clear on plans. Plans need to clearly indicate whether the equipment is electric or gas. Doors and openings into the kitchen/cooking area need to be clearly identified.
- ☐ 2. For any cooking, warming or automatic washing equipment not located under a hood (Type I or Type II) manufacturer's specifications or installation manuals shall be provided. (Certain listed equipment may not require a hood.)
- ☐ 3. For *extra-heavy-duty cooking appliances*, those using solid fuel such as wood, charcoal, briquettes and mesquite, a separate hood and exhaust system are required. (IMC 507.2.4)

Ventilation Exhaust Hood

There are three options for hoods- the hood can be a factory-built commercial exhaust hood listed and labeled per UL710; the cooking or other equipment can have a factory-built commercial cooking recirculating system listed and labeled per UL710B; or the hood can be designed, built and installed per the requirements of 2015 IMC Section 507.

1. For a factory-built commercial exhaust hood listed and labeled per UL710-
   - ☐ a. Provide the exhaust hood model number and manufacturer on the hood plans, and provide the manufacturer's specifications, installation instructions and/or drawings.
   - ☐ b. Hood plans will clearly specify how the Type I hood automatically activates when cooking operations occur- interlock with cooking appliances, heat sensor or other approved means. (IMC 507.2.1.1)
   - ☐ c. Provide information and plan details on hood supports. Type I hoods require non-combustible supports. Hood plans need to contain information on the type of structural component the hood will be supported by, i.e. wood truss, wood rafter, steel bar joist, roof deck, floor deck, etc. (IMC 507.6)
   - ☐ d. Hood plans need to note that Type I hoods shall be installed with a clearance to combustibles of not less 18 inches. This includes structural components, combustible ceiling finishes, and make-up air ducts. (IMC 507.9)
   - ☐ e. Hood plans will note the requirements for a performance test per IMC 507.16, and that the permit holder shall furnish the equipment and devices to perform the test.
2. For factory-built cooking equipment having a listed and labeled recirculating system per UL710B-
   - ☐ a. Provide the equipment model number and manufacturer on the hood plans, and provide the manufacturer's specifications and installation or operating instructions.
   - ☐ b. Equipment plans will note the requirements for a performance test per IMC 507.16, and that the permit holder shall furnish the equipment and devices to perform the test.
3. For an exhaust hood **that is not** listed and labeled per UL710-
   - ☐ a. If known, provide the exhaust hood model number and manufacturer on the hood plans, and if available, provide the manufacturer's specifications, installation instructions and/or drawings.
   - ☐ b. Hood plans will clearly specify how the Type I hood automatically activates when cooking operations occur- interlock with cooking appliances, heat sensor or other approved means. (IMC 507.2.1.1)
   - ☐ c. Hood plans will clearly indicate the minimum thickness of the steel used for the hood construction (IMC 507.4 or 507.5)-
     - ☐ Type I, steel- .0466 inch, No. 18 Gage
     - ☐ Type I, stainless steel- .0335 inch, No. 20 MSG
     - ☐ Type II, steel- .0296 inch, No. 22 Gage
     - ☐ Type II, stainless steel- .0220 inch, No. 24 Gage
   - ☐ d. Provide information and plan details on hood supports. Type I hoods require non-combustible supports. Plans need to contain information on the type of structural component the hood will be supported by, i.e. wood truss, wood rafter, steel bar joist, roof deck, floor deck, etc. (IMC 507.6)

- ☐ e. Hood plans must specify, for the hood, the type of joints, seams, and penetrations to be used (How will the hood be assembled?) (IMC 507.7)
- ☐ f. Hood plans shall note that a Type I hood shall be installed with a clearance to combustibles of not less 18 inches. This includes structural components, combustible ceiling finishes, and make-up air ducts. (IMC 507.9)
- ☐ g. Type I hoods require grease filters. Hood plans need to specifically indicate that proposed grease filters will comply with IMC 507.11.
- ☐ h. For canopy-type hoods, hood plans will clearly show that the inside lower edge of the hood extends a horizontal distance of 6 inches beyond the top horizontal surface of all sides of an appliance or appliances, and that the vertical distance between the front lower lip of the hood does not exceed 4 feet. (IMC 507.12)
- ☐ i. For noncanopy type hoods, hood plans will show that the hood is located a maximum of 3 feet above the cooking surface and that the edge of the hood is setback a maximum of 1 foot from the edge of the cooking surface. (IMC 507.14)
- ☐ j. Hood plans will show that the exhaust capacity (in cfm's) of the hood meets the minimum requirements of IMC 507.13. The duty rating of all appliances under the hood shall be noted and the exhaust rate required for the heaviest duty appliance shall be used. *Hood plans shall show that Type II hoods for dishwashing appliances exhaust a minimum of 100 cfm per linear foot of hood length (IMC 507.13.5).*
- ☐ k. Exhaust outlet locations for the hood will be clearly indicated on the hood plans and be located to optimize capture of particulate matter. Each outlet shall serve not more than a 12-foot section of hood. (IMC 507.15)
- ☐ l. Hood plans will note the requirements for a performance test per IMC 507.16, and that the permit holder shall furnish the equipment and devices to perform the test.

Hood Exhaust Duct

The exhaust duct is where a large number of CKVES fires occur. This is usually due to grease and other particulate build-up in the duct. The codes have very specific requirements for the exhaust duct which need to be clear on the plans. Elevation, or side view plans are required to show exhaust duct routing, etc. Any bends, turns, jogs, etc. in the exhaust duct need to be shown on the plans.

- ☐ a. Factory-built grease ducts listed and labeled in accordance with UL 1978 may be used when the manufacturer's specifications and installation instructions are provided.
- ☐ b. Duct plans shall show that ducts exposed to the outside atmosphere, or a corrosive environment, are protected against corrosion in an approved manner. (IMC 506.2)
- ☐ c. Ducts serving Type I hoods shall be independent of other exhaust systems. (IMC 506.3)
- ☐ d. Duct plans shall show that ducts serving Type I hoods shall be not less than the minimum thickness of ☐ steel .0575 inch (No.16 Gage) or ☐ stainless steel .045 inch (No. 18 Gage) (IMC 506.3.1.1) See code section for exception.
- ☐ e. Duct plans will show that the joints, seams and penetrations of the grease duct will be made with a continuous liquid-tight weld or braze made on the external surface of the duct. (IMC 506.3.2)
- ☐ f. Duct plans shall show that duct joints comply with IMC 506.3.2.1, and that duct to hood joints comply with IMC 506.3.2.2
- ☐ g. Duct plans will show that the duct-to-exhaust fan connection is flanged and gasketed at the base of the fan for vertical discharge or complies with IMC 506.3.2.3 for other fans. Plans need to note that gasket and sealing material are rated for continuous duty at not less than 1500°F.
- ☐ h. Duct plans shall note that prior to use, or concealment (including concealment by required fire wrap), of the grease duct, a leakage test shall be performed in the presence of the building inspector or building official. See IMC 506.3.2.5 for test methods.
- ☐ i. Support of the grease duct needs to be shown or indicated. If the grease duct is to be supported by the hood, then the combined weight of the duct and hood shall be provided. Supports for grease duct shall be non-combustible and no bolts, screws or rivets can penetrate the duct wall. (IMC 506.3.3)

- ☐ j. The minimum duct velocity in feet per minute shall be provided on the duct plans. (IMC 506.3.4)
- ☐ k. Duct plans shall clearly show that the grease duct will have minimum clearance of 18 inches to any combustible construction. Clearance to non-combustible construction and gypsum board attached to metal studs or non-combustible construction shall be a minimum of 3 inches. **If a grease duct "fire wrap" product is proposed to reduce the clearance to combustibles the product name and the applicable, current evaluation report number showing that it has been evaluated per ASTM E2336 (No ICBO, BOCA, NER numbers are acceptable) will be noted on the plans. Any special installation instructions noted in the evaluation report will be clearly addressed on the duct plan. (IMC 506.3.6)
- ☐ l. Duct plans will identify any horizontal grease duct runs and address the slope requirements found in IMC 506.3.7
- ☐ m. Duct plans will address requirements for cleanouts and other openings per IMC 506.3.8 and 506.3.9
- ☐ n. The duct plan will show that the discharge opening shall be not less than 40 inches above the roof for roof terminations and not less than 10 feet above grade for wall terminations. (IMC 506.3.13.1 and 506.3.13.2)

Exhaust Fan, Duct Termination and Makeup Air

- ☐ a. A roof termination plan, in the case of a roof exhaust termination location, or, a site termination plan, in the case of an exterior wall termination location, shall be provided. A roof plan shall show that the termination of the grease duct is a minimum of 10 feet horizontally from parts of the same or contiguous buildings, adjacent buildings, adjacent property lines and air intakes openings into any building, including make-up air unit intakes. (IMC 506.3.13.3)
- ☐ b. Termination plan will indicate that the exhaust fan is listed and labeled per UL 762 or that it is constructed per IMC 506.3.1.1 (see item D under duct.) Motor size and proposed cfm of fan shall be provided.
- ☐ c. Termination plan will show that the exhaust fan motor is located outside the exhaust air stream. (IMC 506.5.1.1)
- ☐ d. Termination plan will show that for vertical discharge fans an approved grease drain outlet is located at the lowest point of the housing to drain into a drain reservoir. (IMC 506.5.2)
- ☐ e. Termination plan will show that an upblast fan is hinged and supplied with a flexible weatherproof electrical cable to permit inspection and cleaning; and the ductwork extends a minimum of 18 inches above the roof surface (can be shown on duct plan). (IMC 506.5.3)
- ☐ f. Makeup air shall be supplied during the operation of the CKVES in amount approximately equal to (minimum 90%) the amount of air exhausted by all the <u>exhaust systems of the building</u> ~~the hood~~. Termination plan shall indicate proposed location of makeup air unit or opening. Plans will note proposed cfm for makeup air. If makeup air is supplied by a mechanical system, then the plans need to indicate the required interlock between the hood and makeup air unit. (IMC 508.1)
- ☐ g. Plans will address the requirement that the temperature differential between the makeup air and the air in the conditioned space shall not exceed 10 degrees Fahrenheit. (IMC 508.1.1)
- ☐ h. Roof plans need to identify the roof slope. Where the exhaust fan is located on a roof having a slope 3:12 (25%) and greater, roof plans need to show a level 30 in. by 30 in. platform provided on each side of the exhaust fan to which access is required for service, repair or maintenance. The platform shall be provided with 42 in. guardrails with an intermediate cross bar at 21 in. (IMC 306.5.1) Roofs having a slope greater than 4:12 (33%) will require a catwalk from the roof access point to the platforms.
- ☐ i. Roof plans need to show location of required 125volt/20A GFCI service receptacle, which must be within 25 feet of the exhaust fan. (IMC 306.5.2 and 2014 NEC 210.63)

Fire Suppression System

Please note that the fire suppression plans are reviewed and approved by Arizona State Fire Marshal or Fire District with an IGA with Arizona State Fire Marshal and then submitted to Gila County.

- ☐ a. Where a Type I hood is required by the IMC or IFC, an automatic fire-extinguishing system is required. The system shall also have manual activation. Kitchen floor plans or fire suppression plans need to show the location of the manual activation device. (IBC/IFC 904.3.2)
- ☐ b. Plans need to show the location of the manual activation device at or near a means of egress and a minimum of 10' and a maximum of 20'from the equipment. Plans also need to show height between 42 and 48 inches above the floor. (IBC/IFC 904.11.1)
- ☐ c. Fire suppression plans need to provide details on required system and equipment interlocks. All gas and electric shall be shut-off to all equipment under a hood in the event of activation of the suppression system. System reset is to be manual. (IBC/IFC 904.3.3 and 904.11.2)
- ☐ d. If a building fire alarm system is installed the hood fire-suppression system shall be monitored by the building fire alarm system. If applicable indicate on plans. (IBC/IFC 904.3.5)
- ☐ e. Pre-engineered automatic dry- and wet-chemical extinguishing systems shall be tested in accordance with UL300 and listed and labeled for the intended application. If other types of systems are used provide the manufacturer's specifications and installation manuals, system will have to have some type of listing. Wet chemical systems shall be installed per NFPA 17A. The listing of the suppression system shall be on the plans. (IBC/IFC 904.11)
- ☐ f. Plans need to show location of required portable fire extinguisher, which must be within a 30 foot travel distance of the cooking equipment. (IFC 904.11.5) If deep fat fryers or solid fuels used a Class K portable fire extinguisher is required. See IFC 904.11.5.1 and .2 for sizing of the extinguishers.

Other Recommended Requirements

- ☐ a**.** Air Balance- Design plans for a facility with a CKVES shall include a schedule or diagram indicating the design outdoor air balance. The design outdoor air balance shall indicate all exhaust and replacement air for the facility, plus the net exfiltration if applicable. The total replacement air airflow rate shall equal the total exhaust airflow rate plus the net exfiltration.
- ☐ b. Note on plans per 2015 IFC 609.4 Gas-fired cooking appliances on casters shall be connected to the gas piping system with an appliance connector listed as complying with ANSI Z21.69 and a restraining device.

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